

Hamilton (A. Mc.)

UPON TRANSFERRED PATELLAR TENDON-
REFLEX. ✓

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OUR attention is sometimes directed to anomalous cases of disease of the nervous system in which the so-called transfer symptoms exist. In those examples, when associated movements which are so common in various phases of pyramidal degeneration are present, the pathological explanation may lie in a cerebral or spinal commissural arrangement.

In alluding to the existence of reflex excitement in connection with lateral-column disease, Ross and others call attention to certain crossed-reflexes which are evoked when the periosteum or fasciæ are the initial points of shock. In 1873 I pointed out the fact that in irregular posterior spinal sclerosis it was possible by galvanization of the quadriceps of one extremity to produce contraction of the muscle in the other. Since that time various observers have noticed the same phenomenon, and the transfer of reflexes, not only in posterior spinal sclerosis, but in other diseases, has come to be accepted as a clinical fact. The following history is one which demonstrates a much more interesting phase of reflex activity than any I have seen, and I think it proves that in certain cases there is a direct and limited crossing of centripetal impulses in the cord.

L. J., aged 48, is a man of good habits, yet a rather free liver. His family history discloses no nervous disease, and there is no

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reason to suspect syphilis. He has led an active life and done much hard work. About four years ago he began to manifest the symptoms of his present malady. He was restless, irritable, and at times melancholic and depressed. He was rather boastful, yet his extravagant talk was not that of dementia paralytica, and had some basis. About this time he found that the right upper extremity was weaker than the left, and that it became agitated by tremor which increased when he attempted some complex act. Subsequently the left upper extremity was affected in the same way, and then the legs in turn became weaker and he was obliged to discontinue his daily horseback exercise and his walks, and only left his house when obliged to do so. He had some pains in the lower extremities, mainly confined to the nerve-trunks, but there was no anæsthesia.

I saw him in April last and he has since been under my care. In appearance he presents the facies of Parkinson's disease, and his eyes have an anxious and sorrowful expression. Facial innervation is weak, and fibrillary twitchings, especially of the muscles about the mouth—the orbicularis and levator anguli oris, are quite decided when he attempts to speak. His tongue is the seat of a coarse tremor, with convulsive retraction of the whole organ when it is protruded. His speech is "scanning" and somewhat explosive at times, and labial and lingual articulation is decidedly at fault. Both optic disks show commencing gray-atrophy, but there are no evidences of paresis of the muscles of the eyeball, and no hemiopia. The right pupil is larger than the left. He sits with head bowed and body curved.

There seems to be a general tremulous condition of the entire frame when at rest, and as well, a marked voluntary tremor. This is increased when he is excited. His walk is unsteady and feeble, his feet are somewhat separated, and he sways to and fro when progressing, and seems to be impelled forward; in fact, there is conspicuous festination. The muscles respond, if any thing, rather too actively to both currents, when directly or indirectly applied, and the electric sensibility seems unaffected. He has a rather active expulsion of urine, but beyond slight constipation his bowels are unaffected. His general physical condition is as good as it could well be. Mentally he is disposed to be boastful regarding his professional career and income. The burden of his conversation is about the value of his jewelry and pictures, the extent of his business, and his elation suggests dis-

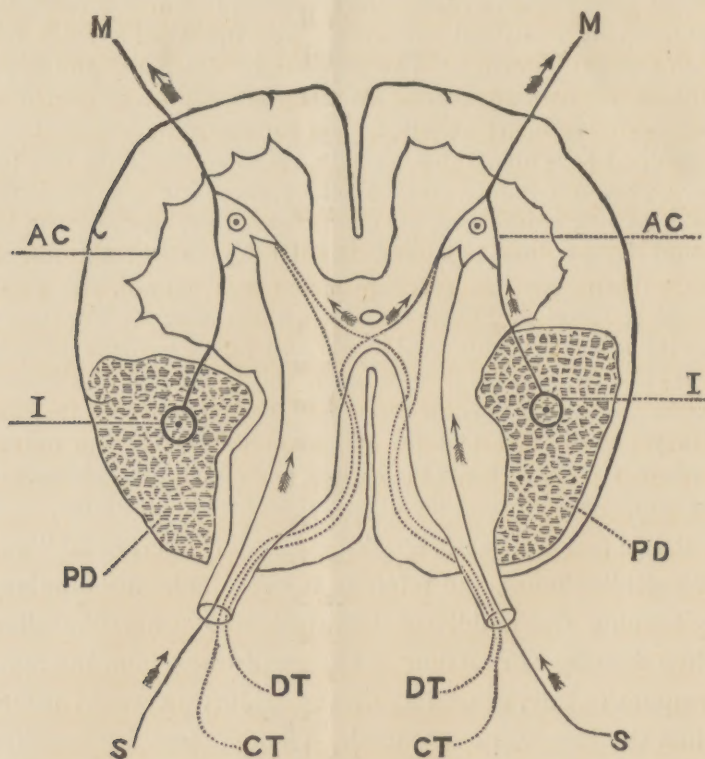
ease. He cannot write except with great effort, and his attempts result in "shakiness," and badly formed words.

The *reflexes* are all exaggerated on both sides, and the slightest cutaneous or tendinous irritation gives rise to decided motor excitement. When in a constrained position, or when both feet are placed upon a chair, a violent and continued tremor is induced, the ankle-clonus is bilateral and violent, and the Achillar-reflex lifts each heel quite forcibly. The cremasteric, abdominal, and upper reflexes are all pronounced. When his thighs are supported so that both legs hang loosely, a very curious phenomenon is witnessed. I have upon three separate occasions made the test and have evoked a limited crossed-reflex; that is to say, when the right patellar tendon was struck a light blow, the opposite leg would present the jerk, and the left foot would be thrown out. When the left patellar tendon was tapped, the result would be reversed. There would be no jerk upon the side struck, but the muscular action would invariably follow in the other limb. I was at first disposed to look upon this peculiarity as a chance expression, or perhaps an associated contraction, but its constancy, and the fact that the muscles of the excited side did *not* respond, convinced me of the curious and extraordinary nature of the symptom. None of the other reflexes were transferred.

Ross,¹ as I have said, speaks of certain "periosteal" and "fascial" reflexes, and refers to the results he has obtained by tapping the middle of the tibia, and other like sites, when ensuing contraction of the quadriceps upon the same or opposite side, as well as of the adductors, would follow when the legs were extended. Though closely resembling the motor disturbance in my patient, I do not believe these examples come under the head of true transferred reflexes such as are presented in the case of L. J. In him the patellar tendon was stretched and struck fairly with the rubber hammer so that no diffused jarring resulted, as might have occurred had the patient been extended upon a bed. The fact of the uniform crossed-results points to the certainty of a primary localized peripheral irritation of the centripetal conductor, and a secondary stimulation of a motor

¹ "The Diseases of the Nervous System," vol. I, p. 153.

centre in the opposite side of the cord. In his case there were no crossed "periosteal" or "fascial" reflexes, and, no true transferred tendinous reflexes in any other part of the body.



AC, AC, cells of anterior horns. M, M, motor conductors. I, I, inhibitory centres. PD, PD, degenerated pyramidal columns. S, S, posterior fibres terminating in skin. DT, DT, direct tendinous fibres. CT, CT, commissural tendinous fibres.

Whether the transfer of the excitation in this case is due to some anomalous anatomical arrangement of the sensory fibres of the cord, or to some unusual location of the lesion, I am unable to say. I believe, however, that other examples may be found when the tests are uniformly made. Here, tofore most observers have tested the patellar-reflex by making the patient cross his legs; or one extremity has

been tested at a time. If both legs are suspended, it is possible that transferred reflexes may be detected, more frequently than they now are, and I have had constructed, for the purpose of determining the absence or presence of the patellar tendinous reflex, a small support of T shape, with a firm base, upon which both thighs may be placed. This is a convenient apparatus in many ways, and of great service when the patient happens to be a corpulent person.

It is very probable that more fibres of the external fasciculi of the posterior nerve-roots pass forward and decussate than we have any idea of; or that the internal group of large motor cells receives sensory connecting fibres, which may sometimes be in excess of the direct fibres. Whether L. J. always presented the crossed-reflex in health is not known. It may be assumed, however, that either through disease of the direct centripetal sensory fibres in that part of the cord from which the second, third, and fourth lumbar nerves arise, or an anomalous development of the crossed fibres, the peripheral stimulation is carried across the cord, and as the inhibitory influence coming from both lateral columns is abolished, the motor discharge may proceed from the cells in either anterior horn. The accompanying plate is intended to show the course of the commissural fibres of the external fasciculi and their cell-connections.

